APRIL 1977
No. 4

# FISHING INFORMATION

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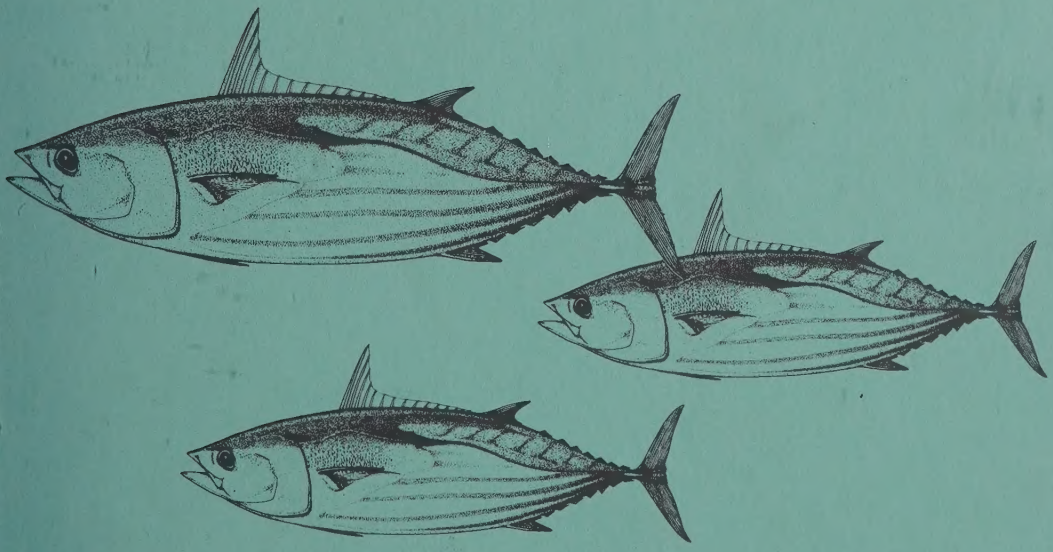

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SOUTHWEST FISHERIES CENTER
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# FISHING INFORMATION

APRIL 1977, No. 4

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# PREFACE

This publication, Fishing Information, appears monthly and contains 1) fishery advisory information, 2) a narrative description of pertinent surface temperature conditions, 3) charts of winds and pressures for the eastern North Pacific, 4) charts of sea surface temperature for the North Pacific and eastern tropical Pacific, and 5) charts of subsurface temperature structure in the eastern North Pacific.

A supplement to Fishing Information appears at 15-day intervals throughout the year. It contains a chart of sea surface temperature (contoured at 2°F (1°C) intervals) from Baja California to Vancouver Island out to about 135°W. Special bulletins are published in conjunction with the 15-day sea surface temperature charts which include short-term projections of albacore distribution and locations of productive fishing areas, information on oceanographic and atmospheric conditions and other information as is appropriate during the albacore fishing season.

The Secretary of Commerce has determined that the publication of this periodical is necessary in the transaction of the public business required by law of this Department.

Submitted for publication - May 20, 1977

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ENVIRONMENTAL CHARTS ANALYZED BY:

F. Miller (Figures 8 and 9)
J. Renner (Figures 1, 2, 3, 4, 5, 6, 7, and 15 day Supplement)

TECHNICAL EDITOR:
R. Allen
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R. Allen, H. Orr

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    National Weather Service, San Diego, California and Washington, D.C.
Fisheries Research Board of Canada, Pacific Environment Institute, West Vancouver, British Columbia by L.F. Giovando from observations by
    L. Sabourin at Langara Island Light; D.C. Robinson at Cape St. James Light;
    L. Collins at Kains Island Light; I.G. McNeil at Amphitrite Point Light
Scripps Institution of Oceanography, La Jolla, California

Expendable bathythermograph and salinity observations are made by the mates and engineers of the *Californian* of the Matson Navigation Co. The data are processed under supervision of D.R. McLain at the NMFS Pacific Environmental Group, Monterey, California, using computer facilities of the Fleet Numerical Weather Central, Monterey. The project is partially supported by the National Science Foundation and the Office of Naval Research.

# Sea Surface Temperature and Environmental Conditions

Forrest R. Miller

rn North Pacific

During April 1977 the subtropical high pressure system dominated nearly all of the eastern ic south of 35°N. The high pressure center began a westward movement in March 1977 and nued moving westward in early April to a position about 25° of longitude west of its normal ion (compare Figures 1 and 2). During April the Aleutian low pressure center had an average ion near 58°N, 150°W which was near its normal position. Two low pressure troughs extended ward and southeastward from the Aleutian low into the high pressure ridge with the Hawaiian ds in between the two troughs. The low level atmospheric circulation was near normal for south of 50°N, but it was considerably weaker than in the previous 3 months of 1977. However, xception to this was in the area west of 155°W from 37°N to 47°N where remnants of the strong r circulation persisted between the Aleutian low and the subtropical high pressure system. ning in October 1976, the deep Aleutian low and the displaced subtropical high pressure r generated some of the strongest winds and roughest seas from 35°N to 45°N on record.

Figure 3 shows the stronger than normal sea surface temperature (SST) gradients, especially 40°N to 45°N west of 155°W. This appears to be the only remaining area which had SST's with ive departures greater than 1°C (Figure 5). However, this area represents a considerable tion in the size of the central Pacific which had SST's more than 1°C below normal in March To the south of 35°N and west of 155°W the positive departures of SST's (Figure 5) reflect nfluence of the high pressure center and weaker than normal winds. East of 150°W and north °N positive departures of SST greater than 1°C nearly vanished in April as a result of ased weather activity between 130°W and 150°W. The increased frequency in April of heavy cloud cover and ocean mixing by winds associated with frontal activity west of British bia and the U.S. northwest caused a fairly rapid removal of surplus heat in the northeast ic. In March 1977 much of the region north of 35°N and out to 140°W had SST's greater than bove normal. In the southeast Pacific SST's were near normal west of Baja California, whereas e previous 3 months of 1977 SST's were 1° to 2°C above normal, especially in the fishing ds to the west and south of Baja.

rn North Pacific

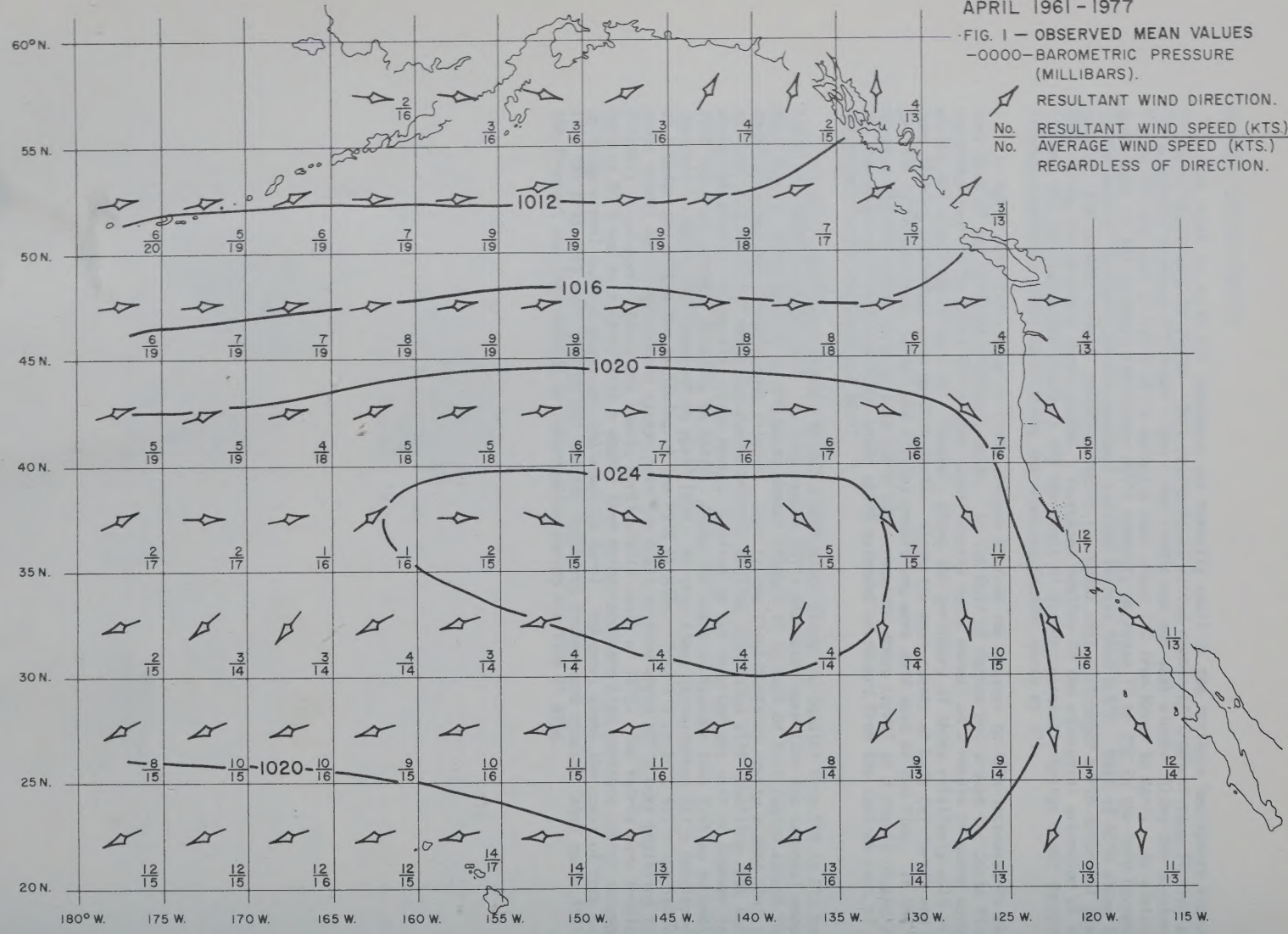
Seasonal warming in the subtropical Pacific was slightly above the normal in April 1977 cularly south of 35°N and west of 170°E. A high pressure ridge with relatively light winds lear skies persisted over most of this region during the month. The SST pattern (Figure 4) d weaker than normal surface temperature gradients in subtropical areas south of 35°N where ive SST departures from normal covered more of the western subtropical region than in March. of the northern part of Japan a low pressure system prevailed in April and a high pressure extended north-south over the Central Pacific between 170°W and 170°E. Between these major ms, winds and seas were high most of April between 40°N and 50°N. Although the large area of ive SST departures from normal had diminished significantly in this region after February, was the remaining cold area of the western Pacific.

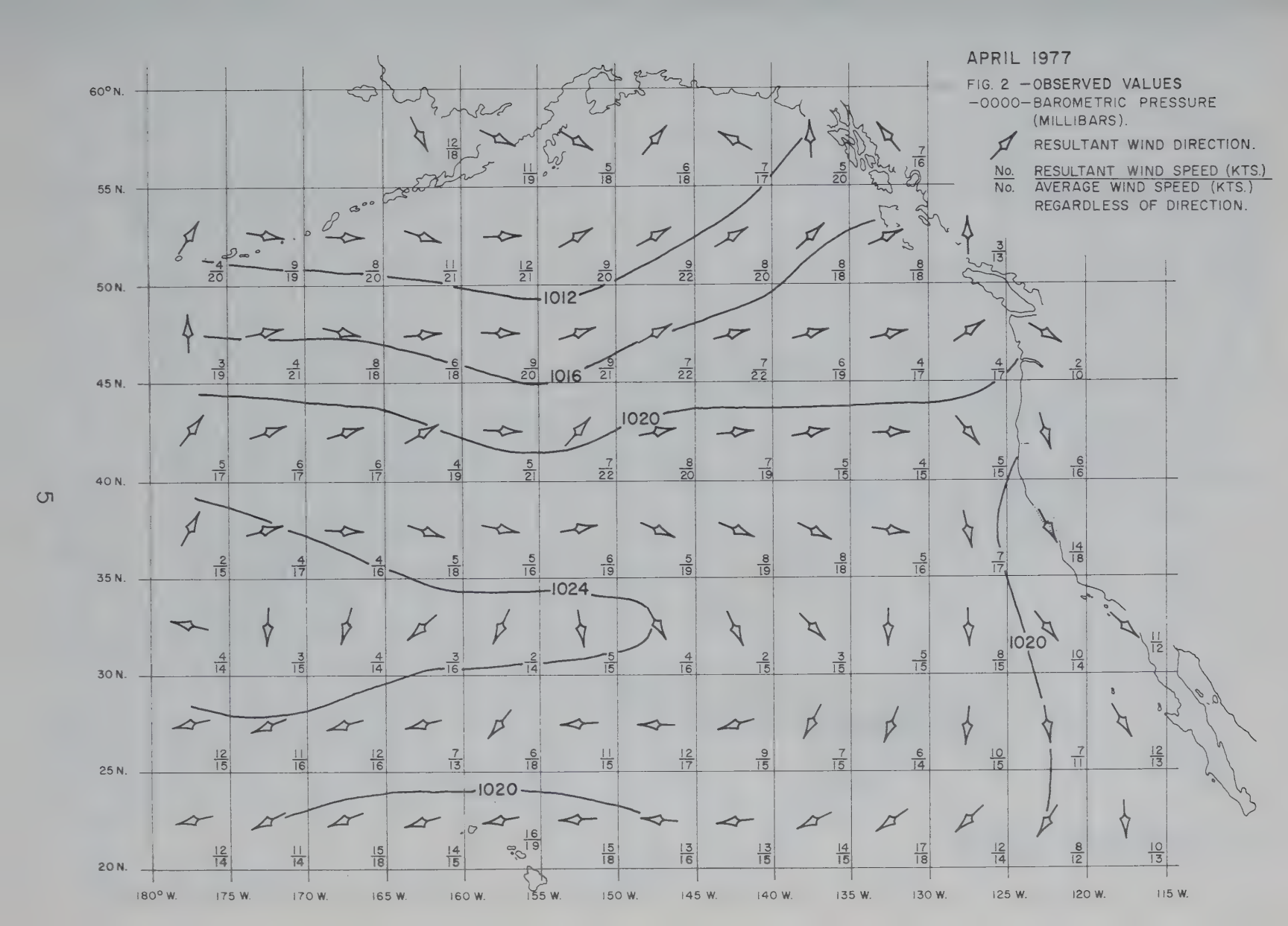
## Eastern Tropical Pacific

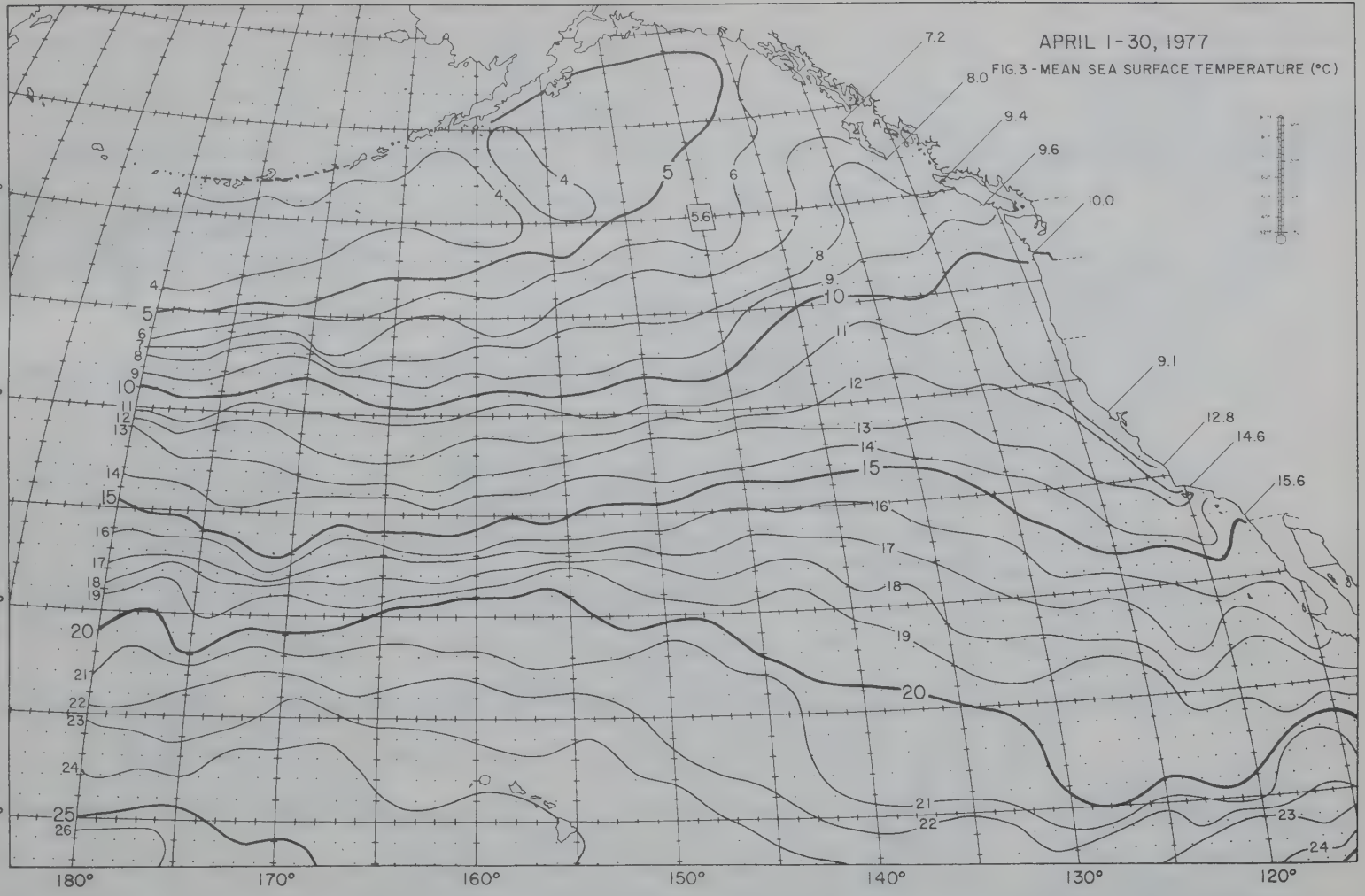
From March to April SST increases are normally small in the northern hemisphere except fro 7°N to 12°N and east of 110°W. This region is an active center of tropical tuna fishing and he SST's normally increase 1°C under light cloud conditions and weak winds. Along the equator from 5°N to 5°S and east of 110°W SST's normally cool about 1°C from March to April. As winter approaches in the southern hemisphere SST's normally decrease 1° to 2°C in the Peru Current, bu to the west of the Peru Current seasonal cooling is less than 0.6°C. East of 90°W along the equator, the oceanic frontal boundary begins to appear with a stronger north-south SST gradient than during the previous three months. Increased cooling in the equatorial extension of the Pe Current and the associated boundary off the coast of Ecuador generally brings about improved tu fishing conditions after April along the coast of Ecuador north of 3°S.

In April 1977 SST's east of 110°W (Figure 8) from the equator to 15°N increased to above 2 over most of the tropical fishing grounds. In the Gulf of Panama and around the Costa Rica dom (centered near 10°N, 89°W) SST's were significantly below normal as a result of above normal oc mixing and upwelling (Figure 9). However, along the periphery of these relatively cold areas tuna fishing conditions were good in April. Along the west coasts of Baja California and Mexic to 20°N SST's were near normal and fishing conditions were good most of the time. In the centr tropical Pacific along 10°N west of 165°W SST's remained above normal as a result of the persis ent low pressure trough and light winds which extended southward from the central part of the north Pacific during March and April.

The most significant changes in SST's took place along the equator from 5°N to 2°S between 100°W and 140°W in April 1977. In this region SST's decreased more than the seasonal amount. As a result, SST's were 1° to 2°C below normal (Figure 9) in much of this region except for a small area west of the Galapágos Islands. This is the first month in nearly a year that the SS pattern (Figure 8) has shown the characteristic cooling associated with upwelling that occurs along the equator, especially after March. Cooling in the Peru Current west of Ecuador intensi fied the ocean frontal boundary in April. Along the coast of Ecuador tuna fishing markedly improved in April 1977 compared to April 1976. At that time, above normal SST's developed west of Ecuador and marked the beginning of the 1976 El Niño. From 5°S to 20°S SST's continued to b above normal nearly everywhere except near the coast of Peru where SST's were beginning to fall slightly below normal along the coast, particularly south of 15°S. The fairly warm tropical oc west of 80°W was associated with a weaker than normal southern high pressure system accompanied by below normal surface pressures and winds in April. However, along the coast of Peru south o 10°S the pressures were near normal and the southeast trades were reestablished again following the frequent and long periods of interruption during the 1976 El Niño.

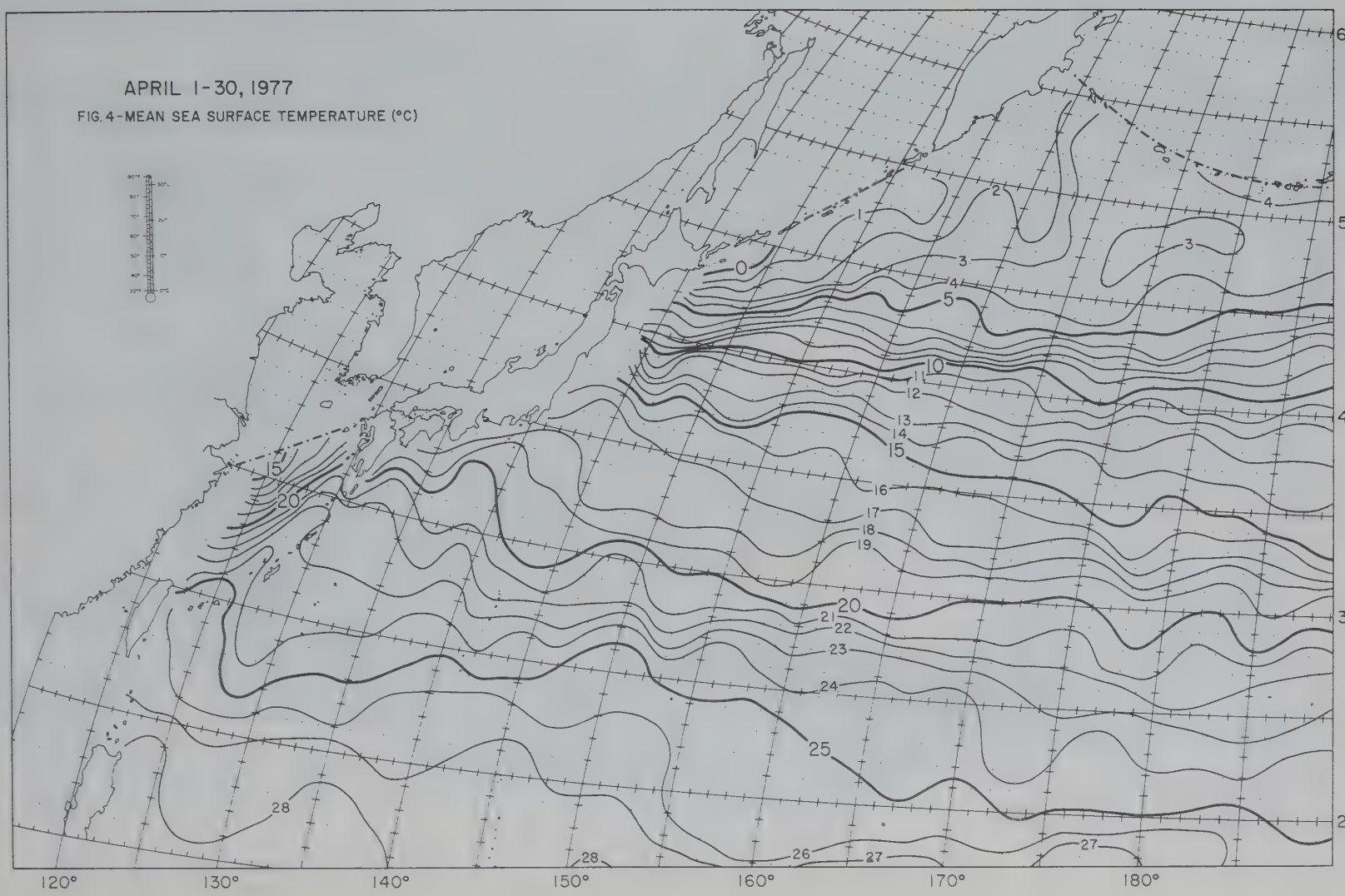

APRIL 1961 - 1977
FIG. 1 — OBSERVED MEAN VALUES
—0000— BAROMETRIC PRESSURE (MILLIBARS).
RESULTANT WIND DIRECTION.
No. RESULTANT WIND SPEED (KTS.)
No. AVERAGE WIND SPEED (KTS.) REGARDLESS OF DIRECTION.
1012
1016
1020
1024
1020
60° N.
55 N.
50 N.
45 N.
40 N.
35 N.
30 N.
25 N.
20 N.
180° W.
175 W.
170 W.
165 W.
160 W.
155 W.
150 W.
145 W.
140 W.
135 W.
130 W.
125 W.
120 W.
115 W.

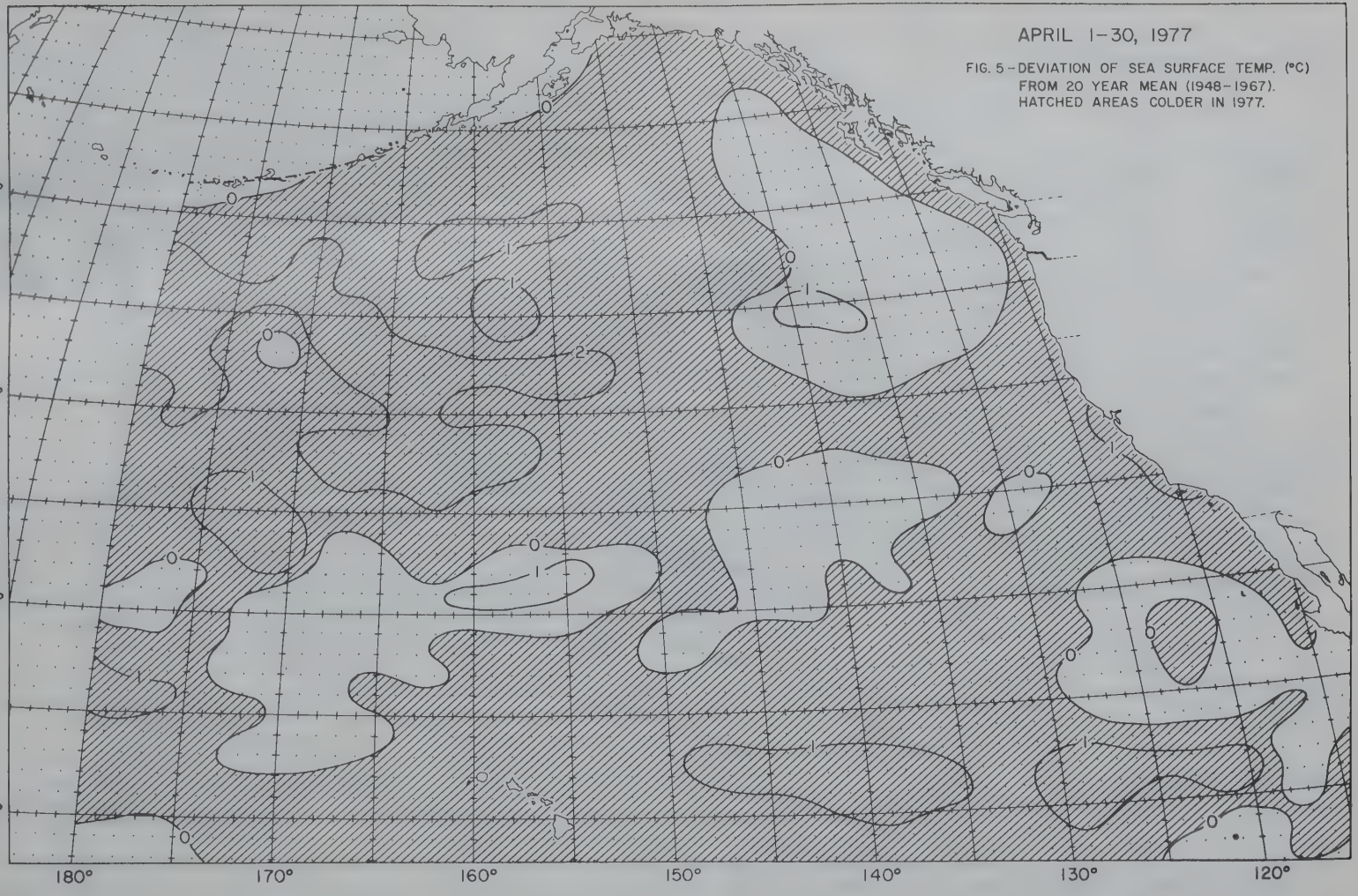

APRIL 1977
FIG. 2 —OBSERVED VALUES
—0000— BAROMETRIC PRESSURE (MILLIBARS).
RESULTANT WIND DIRECTION.
No. / No. RESULTANT WIND SPEED (KTS.) / AVERAGE WIND SPEED (KTS.) REGARDLESS OF DIRECTION.
1012
1016
1020
1024
1020
1020
60° N.
55 N.
50 N.
45 N.
40 N.
35 N.
30 N.
25 N.
20 N.
180° W.
175 W.
170 W.
165 W.
160 W.
155 W.
150 W.
145 W.
140 W.
135 W.
130 W.
125 W.
120 W.
115 W.

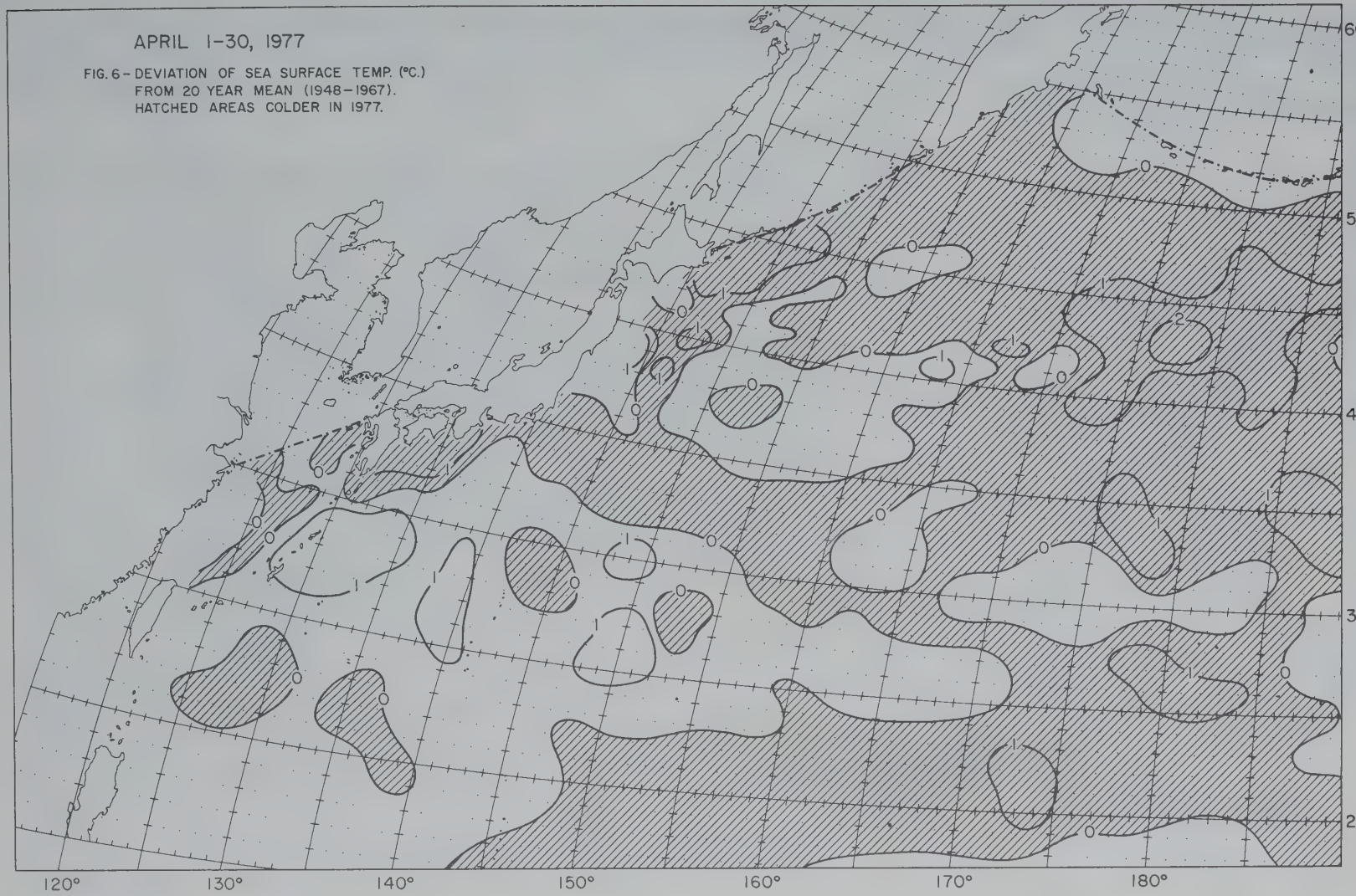

APRIL 1-30, 1977
FIG.3 - MEAN SEA SURFACE TEMPERATURE (°C)
7.2
8.0
9.4
9.6
10.0
9.1
12.8
14.6
15.6
5.6
50°
40°
30°
20°
180°
170°
160°
150°
140°
130°
120°

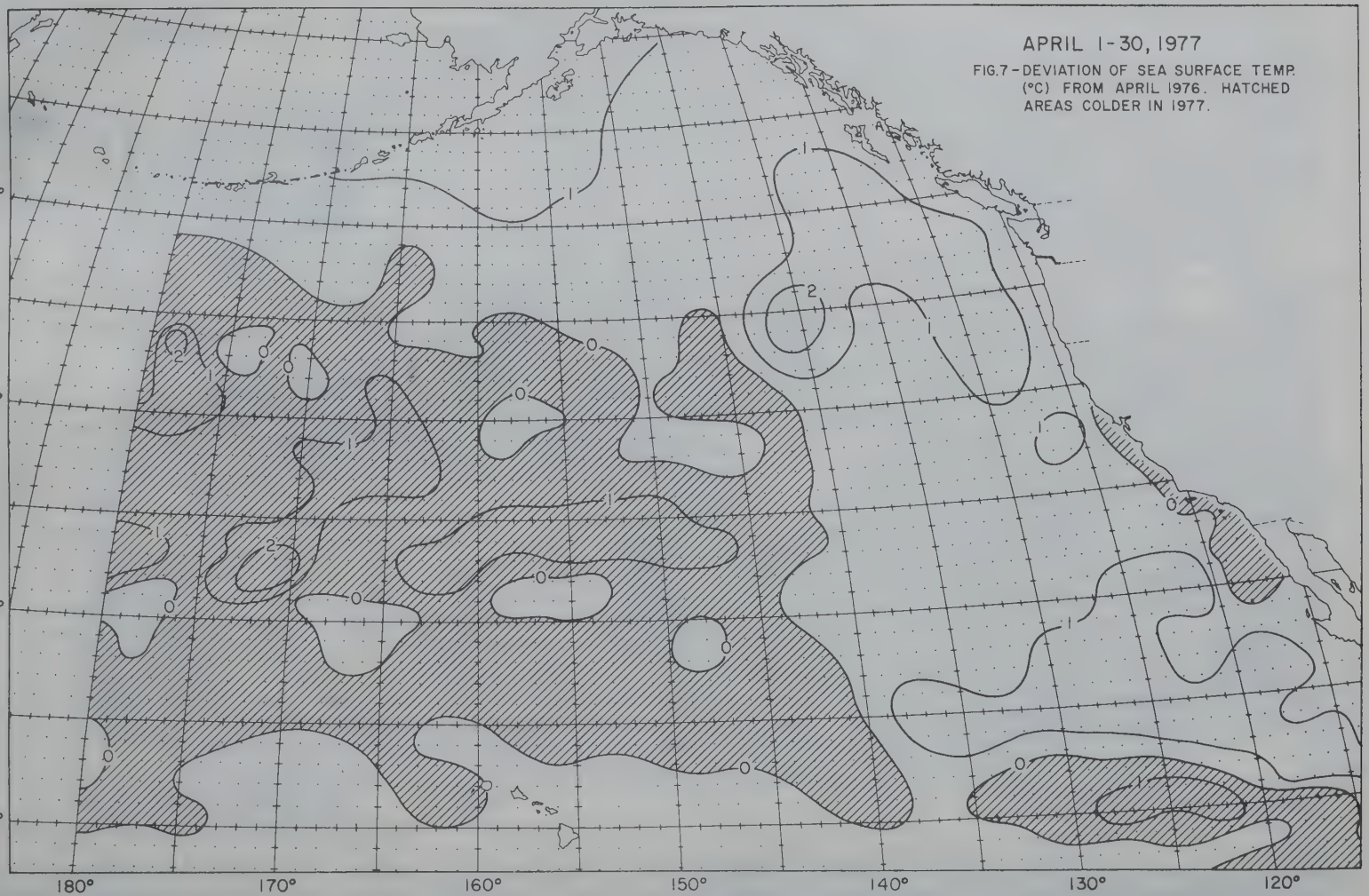
APRIL 1-30, 1977

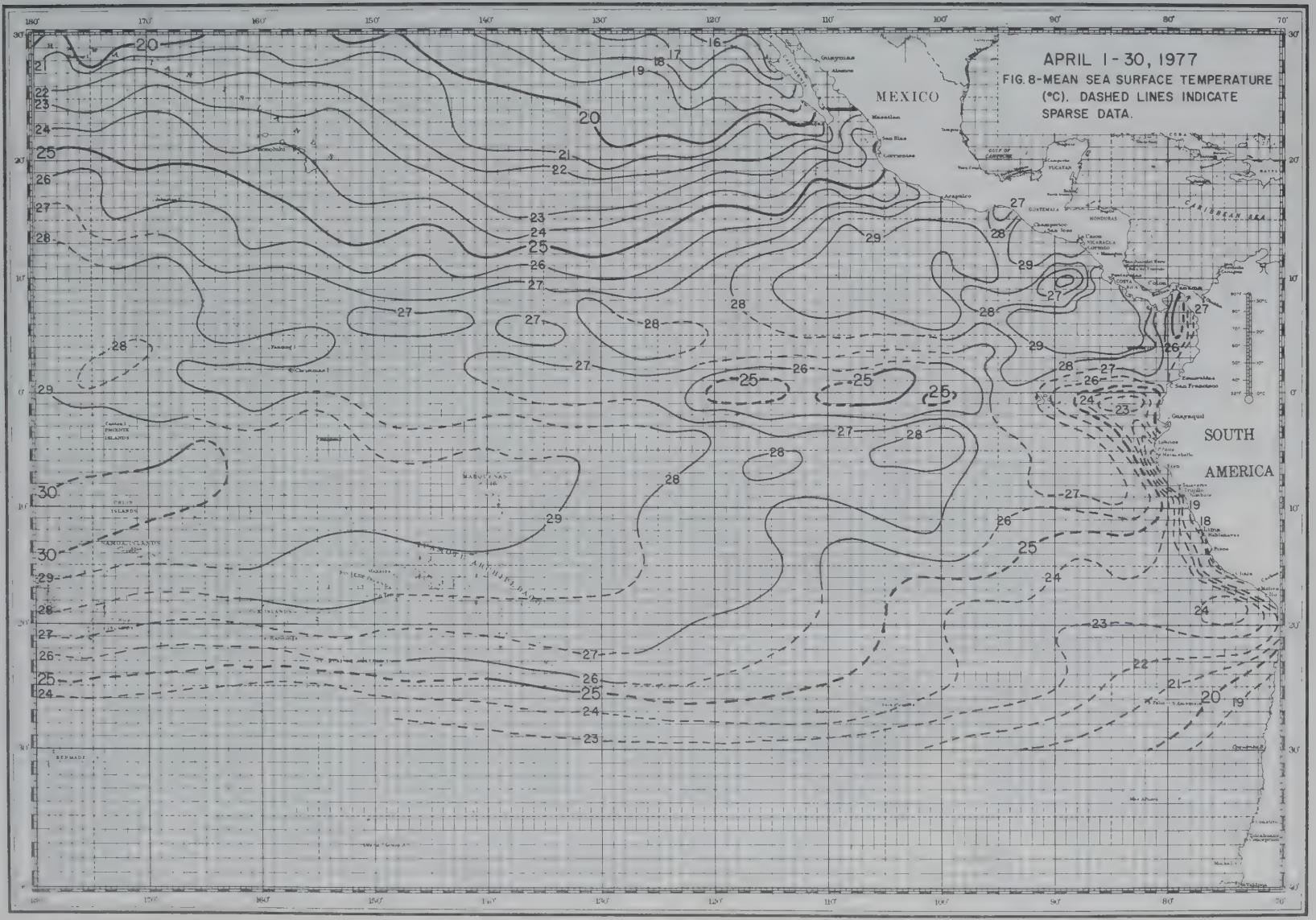
FIG. 4-MEAN SEA SURFACE TEMPERATURE (°C)

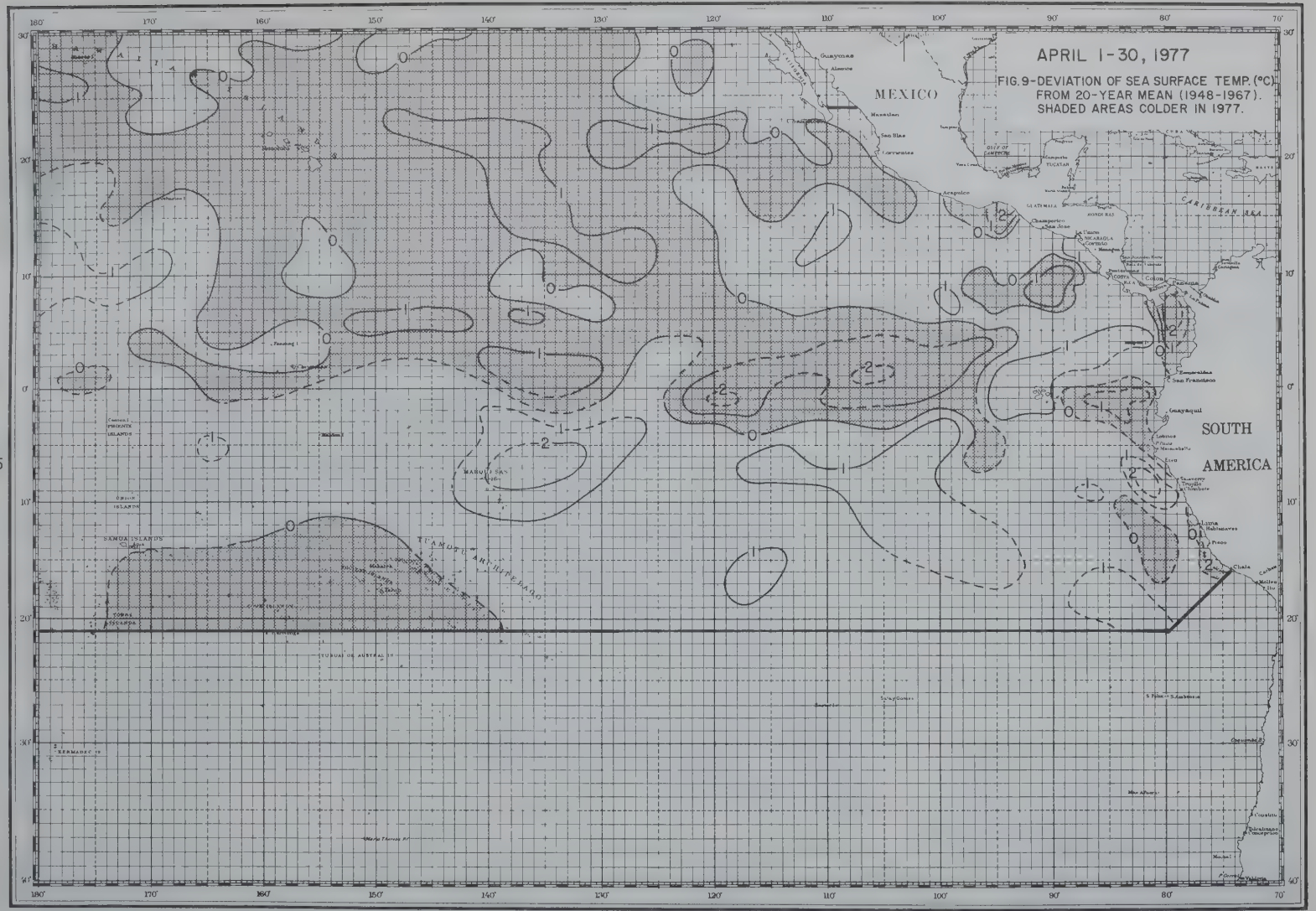



APRIL 1-30, 1977
FIG. 5 - DEVIATION OF SEA SURFACE TEMP. (°C) FROM 20 YEAR MEAN (1948-1967). HATCHED AREAS COLDER IN 1977.
50°
40°
30°
20°
180°
170°
160°
150°
140°
130°
120°


APRIL 1-30, 1977
FIG. 6 - DEVIATION OF SEA SURFACE TEMP. (°C.)
FROM 20 YEAR MEAN (1948-1967).
HATCHED AREAS COLDER IN 1977.
60°
50°
40°
30°
20°
120°
130°
140°
150°
160°
170°
180°


APRIL 1-30, 1977
FIG.7 - DEVIATION OF SEA SURFACE TEMP. (°C) FROM APRIL 1976. HATCHED AREAS COLDER IN 1977.
50°
40°
30°
20°
180°
170°
160°
150°
140°
130°
120°


APRIL 1 - 30, 1977
FIG. 8-MEAN SEA SURFACE TEMPERATURE (°C). DASHED LINES INDICATE SPARSE DATA.
MEXICO
SOUTH AMERICA
CARIBBEAN SEA
GUATEMALA
HONDURAS
NICARAGUA
COSTA RICA
PANAMA
GUAYAQUIL
GULF OF FONSECA
YUCATAN
PHOENIX ISLANDS
SAMOA ISLANDS
BERMUDA


APRIL 1-30, 1977
FIG. 9-DEVIATION OF SEA SURFACE TEMP. (°C) FROM 20-YEAR MEAN (1948-1967). SHADED AREAS COLDER IN 1977.
MEXICO
SOUTH AMERICA
CARIBBEAN SEA
TUAMOTU ARCHIPELAGO
MARQUESAS
SAMOA ISLANDS
PHOENIX ISLANDS
ORONO ISLANDS
TOKELAU ISLANDS
TUVALU (ELLICE ISLANDS)
BERMUDES
Guayaquil
Lima
Callao
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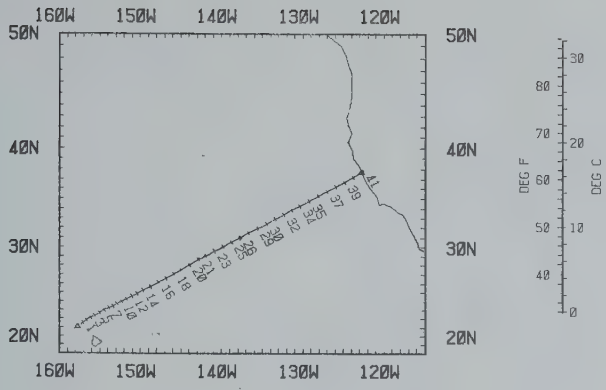
Acapulco
Manzanillo
San Blas
Salina Cruz
Champerico
San Jose
Corinto
Managua
Puntarenas
Colon
Panama
Esmeraldas
San Francisco
Trujillo
Chimbote
Paracas
Pisco
Mollendo
Ilo
Arica
Iquique
Tocopilla
Tabaiso
Valparaiso
Coquimbo
Caldera
Guaymas
Alamos
Mazatlan
Yucatan
Campeche
Veracruz
Tampico
Belize
Honduras
Guatemala
Nicaragua
Costa Rica
Galapagos Is.
Cocos I.
Malpelo I.
Gorgona I.
Gallo I.
Malpelo
Juan Fernandez Is.
Easter I.
Sala y Gomez
Desventuradas Is.
Mocha I.
Santa Maria I.
Robinson Crusoe I.
Pascua I.
Pitcairn I.
Henderson I.
Ducie I.
Oeno I.
Mangareva
Tuamotu
Tahiti
Moorea
Raiatea
Huahine
Bora Bora
Rurutu
Tubuai
Rapa
Rimatara
Rurutu
Tubuai
Raivavae
Marotiri
Austral Is.
Cook Is.
Rarotonga
Aitutaki
Manuae
Penrhyn
Manihiki
Rakahanga
Pukapuka
Nassau I.
Suwarrow
Palmerston
Niue
Tonga
Vavau
Nukualofa
Fiji
Suva
Lau Group
Rotuma
Wallis I.
Futuna
Alofi
Uvea
Hoorn Is.
Niuafo'ou
Niuatoputapu
Tafahi
Swains I.
Fakaofo
Nukunonu
Atafu
Nanumea
Nanumaga
Funafuti
Nukufetau
Nukulaelae
Vaitupu
Niulakita
Rotuma
Kermadec Is.
Raoul I.
Macquarie I.
Auckland Is.
Campbell I.
Antipodes Is.
Bounty Is.
Chatham Is.
Norfolk I.
Lord Howe I.
Middleton Reef
Elizabeth Reef
Hunter I.
Minerva Reef
Matthew I.
Hunter I.
New Caledonia
Loyalty Is.
Walpole I.
Entrecasteaux Reefs
Chesterfield Is.
Coral Sea Is.
Willis I.
Lihou Reefs
Tregrosse I.
Frederick Reefs
Diamond I.
Wreck Reefs
Capricorn Is.
Heron I.
Lady Elliot I.
Fraser I.
Sandy Cape
Moreton I.
Stradbroke I.
Byron Bay
Coffs Harbour
Port Macquarie
Sydney
Jervis Bay
Batemans Bay
Montague I.
Eden
Gabo I.
Cape Howe
Wilsons Promontory
Port Phillip Bay
Geelong
Portland
Cape Otway
Port Fairy
Mount Gambier
Kangaroo I.
Spencer Gulf
Gulf St. Vincent
Port Lincoln
Eyre Peninsula
Great Australian Bight
Esperance
Albany
Cape Leeuwin
Cape Naturaliste
Geographe Bay
Rottnest I.
Fremantle
Perth
Shark Bay
Exmouth Gulf
North West Cape
Barrow I.
Dampier
Port Hedland
Broome
Cape Leveque
Joseph Bonaparte Gulf
Darwin
Gove
Groote Eylandt
Gulf of Carpentaria
Weipa
Thursday I.
Cape York
Torres Strait
Prince of Wales I.
Booby I.
Raine I.
Willis Group
Lihou Reefs
Tregrosse I.
Frederick Reefs
Diamond I.
Wreck Reefs
Capricorn Is.
Heron I.
Lady Elliot I.
Fraser I.
Sandy Cape
Moreton I.
Stradbroke I.
Byron Bay
Coffs Harbour
Port Macquarie
Sydney
Jervis Bay
Batemans Bay
Montague I.
Eden
Gabo I.
Cape Howe
Wilsons Promontory
Port Phillip Bay
Geelong
Portland
Cape Otway
Port Fairy
Mount Gambier
Kangaroo I.
Spencer Gulf
Gulf St. Vincent
Port Lincoln
Eyre Peninsula
Great Australian Bight
Esperance
Albany
Cape Leeuwin
Cape Naturaliste
Geographe Bay
Rottnest I.
Fremantle
Perth
Shark Bay
Exmouth Gulf
North West Cape
Barrow I.
Dampier
Port Hedland
Broome
Cape Leveque
Joseph Bonaparte Gulf
Darwin
Gove
Groote Eylandt
Gulf of Carpentaria
Weipa
Thursday I.
Cape York
Torres Strait
Prince of Wales I.
Booby I.
Raine I.

FIGURE 10

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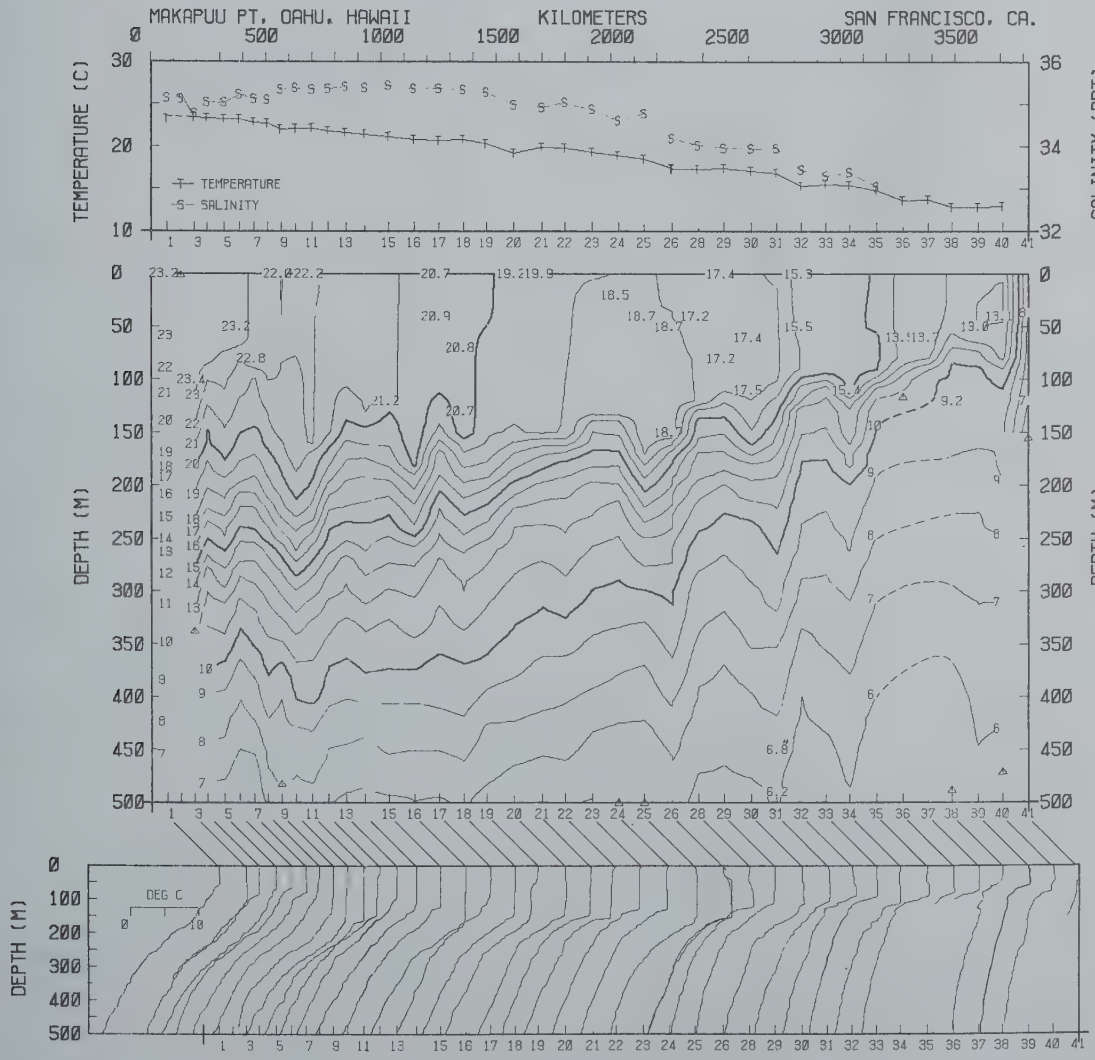

UNITED STATES
DEPARTMENT OF COMMERCE

NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
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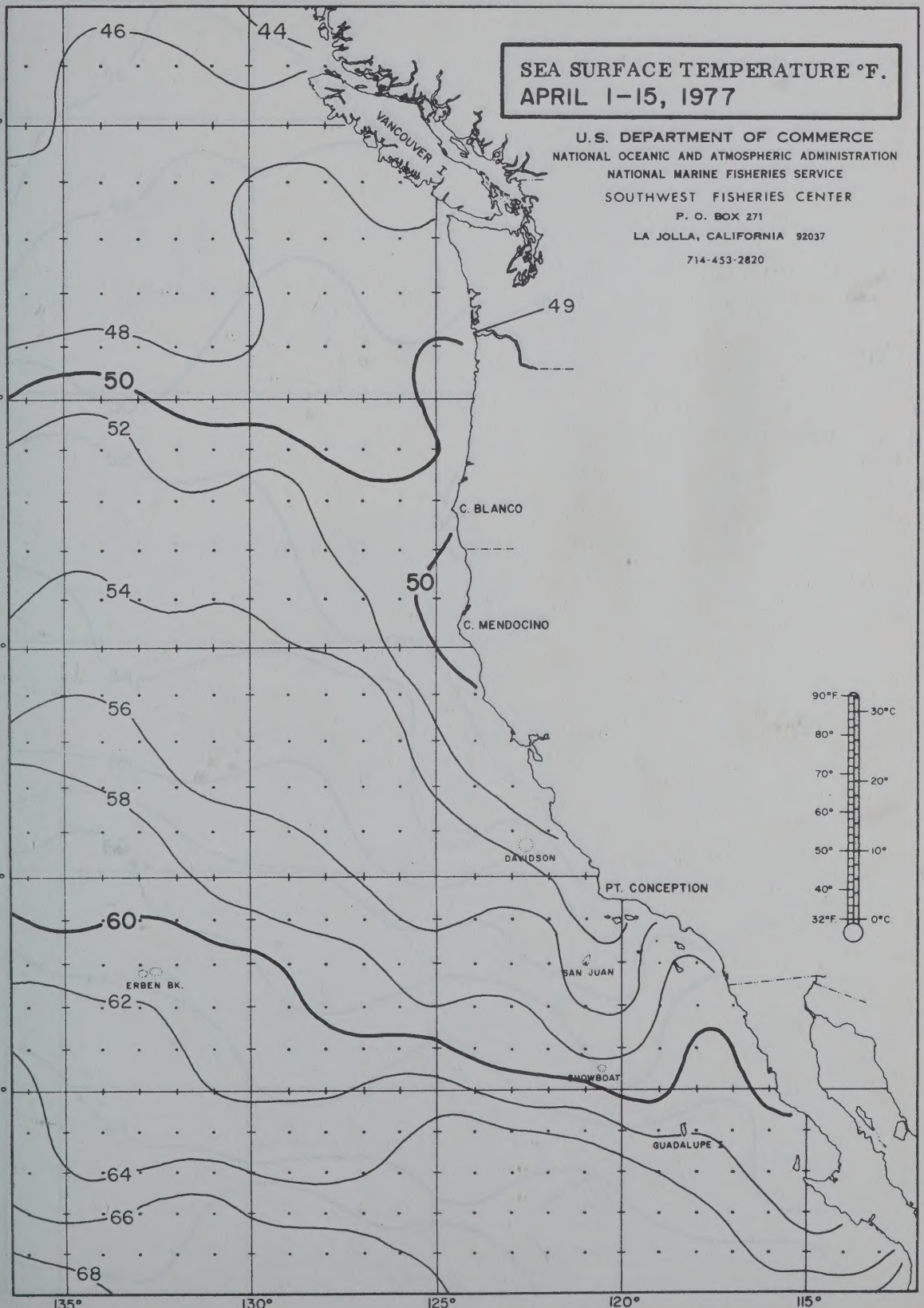

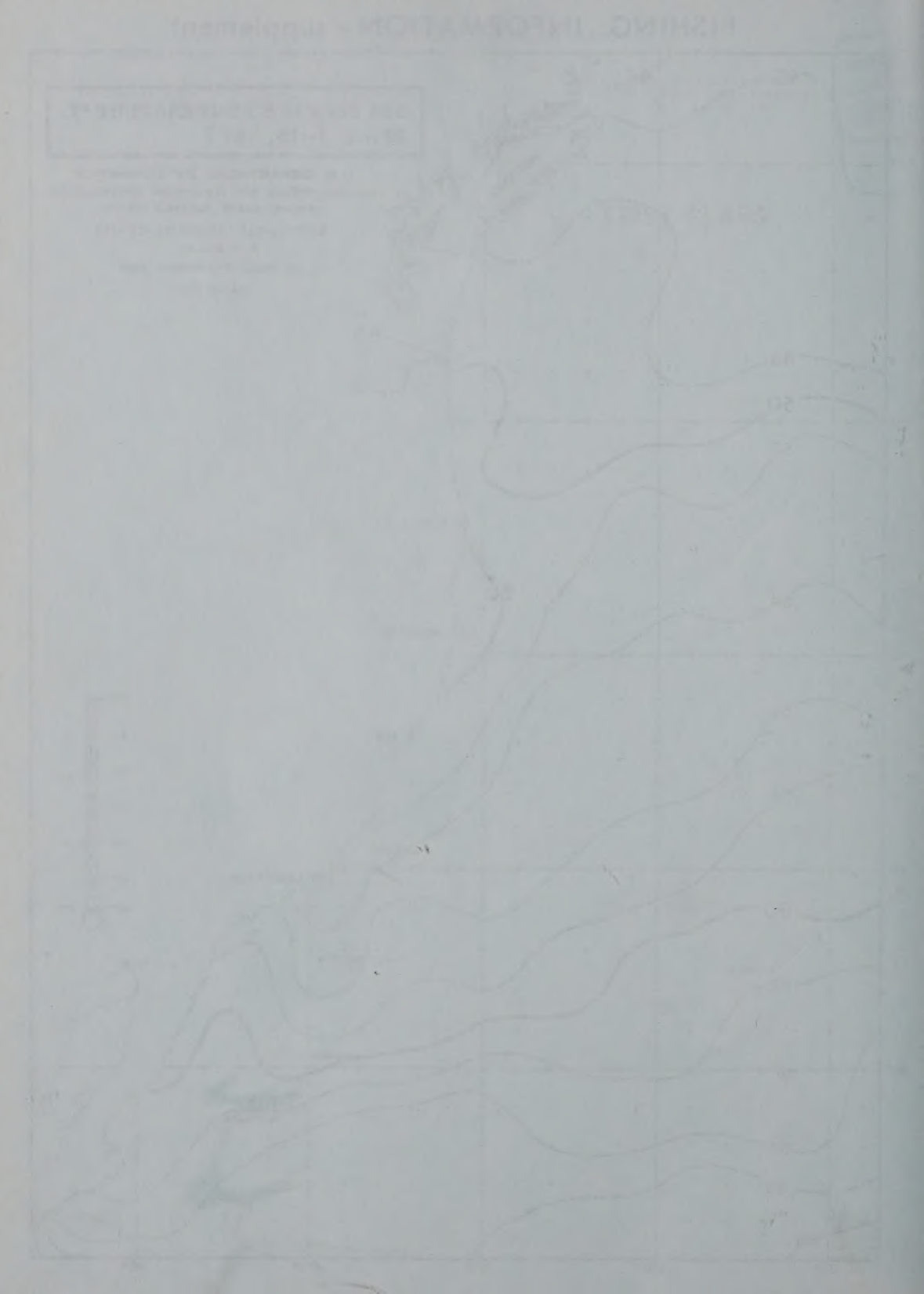

# FISHING INFORMATION – supplement